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10/018,795	12/21/2001	Yutaka Nanno	OGOH:104	1949

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EXAMINER

HU, SHOUXIANG

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/018,795

Applicant(s)

NANNO ET AL.

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

1. Claims 18-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 7. Applicant's election of Group I claims (1-17) with traverse in Paper No. 7 is acknowledged. The traversal is on the ground(s) that the subject matter of all claims (1-20) are so sufficiently related that they should to be searched together and that search and examination of the entire application could be made without overdue serious burden. This is not found persuasive because, as explained in the previous Office action, the inventions of Group I and Group II are distinct, each from the other, and have acquired a separate status in the art as shown by their different classification, the search required for Group II is not necessarily required for Group I, and separated examination would be required. Although only a few classes and/or subclasses were shown in the previous Office action, they are only the representative ones. For a thorough search of the Group I invention, more classes/subclasses, including 257/52-72 and 349/39-47, would be required; and for the Group II invention, more classes/subclasses, including 438/ 30 and 149-166, would be required. Accordingly, search and examination of the entire application would impose a serious burden on the examiner.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

2. The listing of references in the specification (see pages 2-5) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892 or by Applicant in the 3/14/02 IDS, they have not been considered.

In addition, publication date was not provided for the reference of Nanno in the 3/14/02 IDS.

Drawings

3. Figure 38 is objected to as it should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities/defects:

On Page 22, line 23, the phrase of "a brought about by" appears to be incomprehensive.

On page 32, line 10, the term of "concentrations" should read as: --sheet resistance--.

On page 52, line 13, the term of "channel width L" should read as: --channel length L--.

Appropriate correction is required.

Claim Objections

5. Claims 1-6 and 14-17 are objected to because of numerous informalities/defects, including:

The term of "current generated" recited in claim 1 (line 9) should read as: --current being generated--.

In claims 2, 3, 5, 6, 14 and 16-17, the term of "drain region" should read as: --low concentration impurity region-- or light doped drain region--. And, in claims 16 and 17, the recited definition for "R" should be placed in claim 16.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-6, 11-13 and 14-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains

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subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1 and 11-14 indirectly or directly recite the limitation about the sheet resistance R of the LDD region, as the limitation of "the width of the depletion layer" recited in claim 1 is correlated to R , according to Equation (7) on page 22 of the specification. However, the specification fails to provide an adequate description about how R is controlled and measured.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-6 and 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: a clearly defined correlation between the "width of the depletion layer" as recited in claim 1 and the sheet resistance of the low concentration impurity region (LDD region), such as the one defined in Equation (7) on page 22 of the specification.

10. Claims 1-6 and 14-17 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The terms of "proportional relationship" and "specified permissible values" recited in claim 1 are not clearly and definitely defined. It is not clear how the width of the depletion layer or the recited "value" is determined according to what specific function with the photoconductive

current based on what specific permissible value. Different LCD devices having different structures, such with or without a light shield, would have different correlations between the leaking current and the backlight brightness; and different applications would require different levels of permissible values for the photoconductive current.

Furthermore, the terms of "A" in claim 2 and "C" in claims 14 and 16 are not definitely defined.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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12. Claims 8, 9 and 11, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 102(e) as being anticipated by Miyasaka et al. ("Miyasaka"; US 6,180,957).

Miyasaka discloses a thin film transistor (Figs. 26-46, particularly see the N-channel TFT in Figs. 42 and 43, also see col. 44, lines 8-16) used in a display device, comprising a polysilicon layer (72) including a channel region and LDD region(s) between S/D regions therein, wherein the length of the LDD region ΔL can be 2 microns; channel width W can be 10 microns; S-D voltage V_{lc} can be 5 V; and channel length can be 2.5 microns, which naturally satisfy the equations (Eq. 3 and 4) defined in claims 8 and 9, respectively.

Regarding claim 11, Miyasaka further discloses that the doping dose for the low concentration impurity region can be about $5 \times 10^{13} \text{ cm}^{-2}$ (see col. 39, lines 5-13), which corresponds to a sheet resistance of about $52 \text{ k}\Omega/\square$ (according Fig. 37).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 10 and 12, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka et al. ("Miyasaka"; 6,180,957) in view of Yamazaki et al. ("Yamazaki"; US 6,218,219).

The disclosure of Miyasaka is discussed as applied to claims 8, 9 and 11 above.

Although Miyasaka does not expressly disclose that the channel width can be 2 microns or less, one of ordinary skill in the art would readily recognize that the channel width of TFT is well-recognized parameter of importance subject to routine experimentation and optimization, that a small channel width helps to reduce the size of the TFT, and that the channel width of a TFT can be readily as small as 2 microns or less, as evidenced in Yamazaki (see col. 9, 18-22 and col. 25, 66-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the TFT of Miyasaka with the channel width being 2 microns or less, as taught in Yamazaki, so that a TFT display device with optimized performance and reduced size would be obtained.

15. Claim 13, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka et al. ("Miyasaka"; 6,180,957) in view of Applicant's admitted prior art ("AAPA") and/or Kunii et al. ("Kunii"; US 5,412,493).

The disclosure of Miyasaka is discussed as applied to claims 8, 9 and 11 above.

Although Miyasaka does not expressly disclose that the low concentration impurity (i.e., LDD) region can be formed only in the drain side, it is noted that it is well known in the art that the LDD region can be formed only in the drain side for further reducing the size of a TFT and further increasing the On-current, as evidenced in

Applicant's admitted prior art (see page 9, lines 16-20, in the specification) or Kunii (see the LDD region in Figs. 2-4).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to TFT of Miyasaka with the low concentration impurity region being formed only in the drain side, as taught in AAPA and/or Kunii, so that a TFT display device with further reduced size and increased On-current would be obtained.

16. Claims 1-3, 5 and 7, insofar as in compliance with 35 U.S.C.112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka et al. ("Miyasaka"; 6,180,957) in view of Ohta et al. ("Ohta"; US 6,532,053).

The disclosure of Miyasaka is discussed as applied to claims 8, 9 and 11 above.

Although Miyasaka does not expressly disclose that the TFT display device further comprises a backlight having a brightness of about 2000 cd/m² or higher, Ohta teaches that a TFT display device commonly includes a backlight with a brightness that can be 3000 cd/m² (see col. 3, line 60) for achieving adequate display brightness.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporate the backlight of Ohta into the TFT display device, so that a TFT display device with adequate display brightness would be obtained. And, in such a TFT display device, the photoconductive current can always fall within a range of certain permissible values suitable for certain types of applications.

Regarding claims 2 and 3, Equation 2 defined in claim 3 would be naturally satisfied with the values of R (52) and W (10) in Miyasaka.

Regarding claim 7, Miyasaka further teaches that the length of the LDD region ΔL can also be 1 micron or less (see col. 41, 17-22).

17. Claims 4, 6 and 14-17, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka in view of Ohta as applied to claims 1-3, 5 and 7 above, and further in view of Yamazaki et al. ("Yamazaki"; US 6,218,219).

The disclosures of Miyasaka and Ohta are discussed as applied to claims 1-3, 5 and 7 above.

Although Miyasaka and Ohta do not expressly disclose that the channel width can be 2 microns or less, one of ordinary skill in the art would readily recognize that the channel width of TFT is well-recognized parameter of importance subject to routine experimentation and optimization, that a small channel width helps to reduced the size a TFT, and that the channel width of a TFT can be readily as small as 2 microns or less, as evidenced in Yamazaki (see col. 9, 18-22 and col. 25, 66-67).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to make the TFT device collectively taught by Miyasaka and Ohta with the channel width being 2 microns or less, as taught in Yamazaki, so that a TFT display device with optimized performance and reduced size would be obtained.

Regarding claims 14-17, it is noted that Miyasaka further teaches that the TFT can be used as a switch element in an LCD panel or an electroluminescent display panel (which inherently has a light-emitting layer with a counter electrode formed thereon; and the brightness of the light emitting layer is commonly no higher than that of a conventional backlight); and that Equation 6 defined in claims 14 and 16 would be naturally satisfied with the values of R (52), B (3000) and W (2) in the above TFT device collectively taught by Miyasaka, Ohta and Yamazaki.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or

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proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
May 2, 2003



Shouxiang Hu
Patent Examiner
TC2800